SIEMENS

Network ID Camera

SP

Configuration

NIC2-2 TCP/IP FTP Communication

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TCP/IP FTP Communication

NICLan

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1 Contents

1 CONTENTS 2

2 INTRODUCTION 3

3 PATIENT DATA 3

3.1 GENERAL 3
3.2 DIRECT MODE 3
3.3 DOWNLOAD MODE 3
3.4 EXPOSURE DATA 4
3.5 PHYSICAL CONNECTION 4

4 UDP PROTOCOL 4

4.1 UDP LOOKUP 4

5 FTP PROTOCOL 5

6 PROTOCOL DATA DESCRIPTION 6

6.1 BOOKING DATA 6
6.2 DIRECT DATA 7
6.3 EXPOSURE DATA 7
6.4 DATE AND TIME STRING 10

2 Introduction

This specification describes the communication between a host system and the communication interface NICLan for downloading booking data and uploading exposure together with the NIC2-2 ID Camera. Communication between NICLan and NIC2-2 is not covered.

The specification is relevant only for NICLan software version 2.9. The version number is displayed on the NIC display, a short time after the NICLan power is connected.

Interfaces and protocols for communication with X-ray stands and other equipment are not covered by this document but can be found in the Network Installation Manual.

3 Patient data

3.1 General

The Network ID camera is able to receive patient data from a patient booking system. This can be achieved in two ways depending on how the booking system works. These are Direct- and Download- mode.

In both cases NIC is connected via NICLan to a Local Area Network.

The Network ID Camera can return exposure data to a host system. This is only possible when the NIC is connected via a NICLan to a Local Area Network.

3.2 Direct mode

This mode is used when each camera is connected to its own terminal of the booking system. When a patient arrives to the examination room and is registered at the terminal of the booking system, the booking system sends the patient data to the NIC that immediately will display it. This means that no user interaction is necessary on the camera to make the camera ready for marking.

3.3 Download mode

This mode is used when all cameras are connected to the central computer of the booking system through one serial channel or if there are no terminals in each room. In download mode a complete patient list is sent to each camera and the operator has to bring up this list on the camera to select the patient when the patient arrives at the examination room.

Except for patient data, time and date of the booking is also sent, which the Network ID Camera uses to sort the booking list. When the user brings up the booking list, the patient closest in time is pointed out. This means that the user only needs a few keystrokes to select the patient.

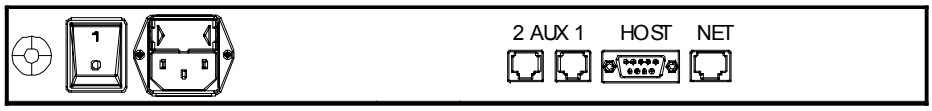
To allow a camera to only store patients intended for a specific room each patient data record is associated with a camera name and the camera may reject all patients not intended for a specific room. Note that it is possible for more then one camera to have the same name, for example if there are many rooms that do the same examination and the patients are taken to the room that gets available first. Patients can be sent to the booking list at any time and any number of times. Duplicates are thrown away and when the booking list becomes full the patient with the oldest booking time is removed from the list.

3.4 Exposure data

If an X-ray stand is connected to the NIC it is possible to have all exposure parameters sent to a host system. When an exposure of a film is preformed the stand is sending out its exposure parameters. These parameters are handled by the NIC and are projected on the film while marking it with patient data etc. At the same time the NIC is sending all defined exposure data to the host system.

3.5 Physical connection

The NICLan communication interface is connected to NIC2-2 via the NET connector on the back of the NIC2-2.



4 UDP Protocol

UDP is used to detect all NICLan connected to the network. Sending an UDB broadcast performs this task. A NICLan connected will respond with its ID etc as described below.

Note that if a LAN router is located between the host system and the NIC it can cause problems when sending UDP messages to the NIC. In these cases the IP address must be manually entered into the host system.

4.1 UDP lookup

This message is sent to detect NICLan connected and their IP-addresses.

Message is sent via an UDP broadcast on port 8001. An UDP message directed to a specific IP address can be used to verify the availability of a NICLan.

```
Sending:     ”0 1”
Answer:      ”<Serial nr.> <DHCP> <IP-Num> <SubNetMask> <Gateway> <Name>”

Example:
To NICLan    ”0 1”
To Host      ”017FE 0 192.168.2.59 255.255.255.0 192.168.2.0 Lab-1”

Serial no.   Unique hexadecimal serial number
DHCP         ”1” means DHCP is used. ”0” means fixed IP address is used
IP-Num       NIC IP number
SubNetMask   NIC SubNetMask
Gateway      NIC Gateway
Name         NIC Device name
```

5 FTP Protocol

FTP is the only way to exchange data between a host system and the NICLan. The host system will send a file with patient data to the NICLan. If the NIC is connected to an X-ray stand, it can save all exposure data received from the stand and put them into a file. This file can later be fetched by the host system. By polling the NICLan it is possible to detect a new file and the upload the file to the host system.

To be able to communicate with the NICLan some settings need to be done. The setup screen for the TCPIP/FTP communication is found under:
"Setup\Communication\Host\Connection".

The "Network Installation Manual" describes the settings in detail.

Select "NICLan" as connection type. Then set IP-number, SubNetMask, Gateway, FtpPort, FtpUser, FtpPassword and finally EXP data.

The default settings can be found in the table below.

```
IP-number:    192.168.2.90
SubNetMask:   255.255.255.0
Gateway:      192.168.2.1
FtpPort:      23
FtpUser:      ftp
FtpPassword:  ftp
EXD Data:     Save
```

There are two ways to handle patient data, either by using the internal booking-list in the ID Camera or using the direct patient data message. In both these cases, files are downloaded to the NICLan via FTP.

Filename	Description
booking.bok	Booklist file. Can hold one or more (max 250) record of <Booking data>. Will be removed by NICLan when read.
xxxxxxxx.exp	Exposure file. Can hold up to four <Exposure data>. Host reads this file and then removes it.

The booking-list is stored in a file "booking.bok". It can consist of one or more records. When the NICLan has read the file, it will automatically be erased. Patient data stored in the booking-list is then available by a few keystrokes on the ID Camera. The booking-list can hold a maximum of 250 patient names. If more records are present the oldest will be lost.

To ensure the integrity of the booking file during transfer it should be copied to the NICLan with a name different from "booking.bok". When transferred to the NICLan it is renamed to "booking.bok".

After a film has been marked, a file with patient data and exposure data* is generated. This file has the extension "*.exp". One file consists of up to four records. The host system should erase this file after it has been read.

See chapter 6 for description of the data.

6 Protocol data description

6.1 Booking data

The booking data contains of patient information. Fields are separated with ';'.

```
Example:
To NICLan:   "#Lab3;021018;1300;L:1;R:13674;N1:Milla Mouse#CRLF"
```

The first fields must ordered as: #<GroupName>;<Date>;<Time>;L: <language code>;…

<GroupName> is the name of the location of the ID Camera. The ID Camera can be configured to only receive records with matching group-name or to receive all records regardless of the group-name in the record.

If no group-name is used, the field can be left blank.

There are seven special fields used by the protocol:

L:<language code>	Language code identifies the language for the date format as described in section 6.4. Code can be: 1 = yymmdd, 2 = ddmmyy, 3 = mmddyy
R:<record number>	Record number comes from the host system database and identifies a specific booking record. This record number will be returned in the exposure data.
T:<initials>	This is the Technologists initials if applicable
I:<PID>	PID is the patient ID of the patient. It should be in the format defined in the country where the camera is used. If the patient ID is invalid it will be displayed as a spare patient ID (underlined) number when appearing on the display.
B:<birthdate>	Birthdate of the booked patient.
N:<name>	Name is the name of the patient. This field or a N1 field is always mandatory when using the download protocol.
Nn:<name>	In the Nn: field 'n' represents a number from 1 to 9. This is used if more then one name field is defined in the window. When the patient name is displayed in the booking list of the camera all Nn fields are merged together with a comma in between. The N1 field will be displayed in the first name field of the window, N2 in the second and so on.
nn:<string>	This is a free format field. 'nn' represents a number from 0 to 99. String could be any character except: ' ; # { } [STX] [ETX]'

See the Network Installation Manual for a more detailed description of the download protocol.

6.2 Direct data

The booking data contains of patient information. Fields are separated with ';'.

```
Example:
To NICLan:   "#1;1:551102-3524;2:Lisa Johnsson#"
```

The first field must be: #<Window number>;… …#

<Window number> is either 1 or 2 depending on the used window

See the Network Installation Manual for a more detailed description of the Direct protocol.

6.3 Exposure data

```
Syntax:        "$EXP=#<Booking data>#<Date>;<Time>;<Exposure data>#CRLF"


Example:
To NICLan:     "$EXP=#Lab3;021018;1300;L:1;R:12345678;N1:Milla
               Mouse#021122;0951;P:100;101:34;102:44;103:58;104:38#
```

The exposure data contains the exposure information retrieved from a connected X-ray stand. The field is in the following format: nr:data

'nr' is the two-digit field number, data is any value in plain ASCII text. If more then one field should be transferred, fields must be separated by ';'.

Note. In column "Length" '*' means max length.

Mammo3000 (P= 100)

No.	Data	Unit	Length
101	Focus		8*
102	Anode		8*
103	Filter		8*
104	kV	kV	2
105	mAs	mAs	3
106	Exp.time	ms	5
107	Magnification		4
108	Force	Kg	2
109	Thickness	mm	3
110	Grid		8*
111	Density		4
112	Angle	° (degree)	4
113	Dose	mGy	4
114	Option		6

Mammo300 (P=200)
Units included in string received from NIC2-2

No.	Data	Unit	Length
201	Focus		8*
202	kV		5
203	mAs		8
204	Exp.time		7
205	Force		5
206	Thickness		6
207	Sense/Density		6
208	Date		9

Planmed (P=300)

No.	Data	Units	Length
301	kV	kV	2
302	mAs	mAs	3
303	Exp.time	sec	3
304	Mode		3
305	AEC sensor		1
306	Filter		2
307	Magnification		3
308	Force	kg	2
309	Thickness	cm	4
310	View		4
311	Angle	° (degree)	3
312	Exp. counter		5
313	Maxview upper draft length		2
314	Maxview lower draft length		2
315	Radiation (dose)	mGy	3

Senographe (P=400)

No.	Data	Units	Length
401	Mode		8*
402	Sub Mode		8*
403	Focal Spot		8*
404	Track		8*
405	Filter		8*
406	kV	kV	2
407	mAs	mAs	3
408	Tpose (exposure)	ms	5
409	Focus		2
410	Magnification	%	3
411	Force	daN	2
412	Thickness	mm	3
413	Cell		8*
414	Screen/Film		7*
415	Radiological thickness		3

Seno800T (P= 500)

No.	Data	Units	Length
501	Mode		8*
502	Sub Mode		8*
503	Focal Spot		8*
504	Track		8*
505	Filter		8*
506	kV	kV	2
507	mAs	mAs	3
508	Tpose (exposure)	ms	5
509	Focus		2
510	Magnification	%	3
511	Force	daN	2
512	Thickness	mm	3
513	Cell		8*
514	Screen/Film		7*
515	Radiological thickness		3
516	Angle	° (degree)	4
517	Glandular dose	mGy	4
518	Grid		8*

Instrumentarium (P=600)

Units included in string received from NIC2-2

No.	Data	Units	Length
601	Technique		1
602	Filter		2
603	Exposure time		5
604	kV		4
605	mAs		6
606	Density correction		3
607	Thickness		5
608	Force		4
609	C-arm tilt		6
610	Avarage patient dose		7
611	Site of detector		2
612	Expossure counter		5

Lorad (P= 700)

Units included in string received from NIC2-2

No.	Data	Units	Length
701	Current View		9
702	Exp Mode		3
703	kV		4
704	Filter		2
705	Focal spot		1
706	C-arm angle		4
707	Compression Force		4
708	mAs		7
709	Density / exp. time		4
710	AEC position		1
711	Accessory		15

GXDP (P= 800)
Where the GXDP protocol is used the manufacturer of xray equipment should in a document present a list specifying which data is represented by which number and maximum length of each data. This list number start with zero (0) and up to maximun 98. NIC2-2 is translate this list so that 0 = 801, 1=802 and so on.

No.	Data	Units	Length
801			
802			
803			

899			

6.4 Date and Time string

The <Date> string can be formatted in different ways depending on the <Lang code>.
Field "L: <Lang code>" sets the formatting of the current record.
<Lang code> can be set to: 1 = yymmdd, 2 = ddmmyy, 3 = mmddyy

```
An example:                    #…;030922;1436;L:1;…
This should be read as:        The 22nd of September 2003 at 2:36 pm
Another example:               #…;220903;1436;L:2;…
This should also be read as:   The 22nd of September 2003 at 2:36 pm
```

The Lang code doesn't affect the <Time> field.